

In the claims:

Please amend the claims as follows:

- 1 1. (currently amended) ~~An downhole tool apparatus~~ for determining the
2 ~~properties a property~~ of a fluid downhole comprising:
3 ~~a downhole tool deployed in a well bore formed in an adjacent formation;~~
4 ~~the tool interacting with a downhole fluid;~~
5 a resonator associated with the fluid downhole fluid;
6 a controller for actuating the resonator;
7 a monitor for receiving a response from the resonator to the actuation of
8 the resonator such that the response is associated with the fluid; and
9 a processor for estimating ~~the a value of a property~~ for the fluid downhole
10 fluid.
- 1 2. (currently amended) ~~The downhole tool apparatus~~ of claim 1, ~~further~~
2 ~~comprising; wherein the processor uses~~ a chemometric equation for
3 estimating ~~a fluid the~~ property value.
- 1 3. (currently amended) ~~The downhole tool of claim 12, further comprising;~~
2 ~~wherein the processor applies a function applying~~ the resonator response
3 to a the chemometric equation to determine a the fluid property value.

1 4. (currently amended) The ~~downhole tool~~ apparatus of claim 1, further
2 ~~comprising: wherein the processor uses~~ a function for deriving a
3 chemometric equation from measured resonator response correlated with
4 known fluid property values.

1 5. (currently amended) The ~~downhole tool~~ apparatus of claim 1, wherein
2 the ~~parameter value~~ property is viscosity.

1 6. (currently amended) The ~~downhole tool~~ apparatus of claim 1, wherein
2 the ~~parameter value~~ property is density.

1 7. (currently amended) The ~~downhole tool~~ apparatus of claim 1, wherein
2 the ~~parameter value~~ property is dielectric constant.

1 8. (currently amended) The ~~downhole tool~~ apparatus of claim 1, wherein
2 the ~~parameter value~~ property is resistivity.

1 9. (currently amended) The ~~downhole tool~~ apparatus of claim 1, further
2 ~~comprising: wherein the processor~~ applying applies the chemometric
3 estimated ~~parameter value~~ property to a Levenberg-Marquardt (LM)
4 algorithm to determine a fluid parameter value for the fluid.

1 10. (original) The downhole tool of claim 10, wherein the fluid parameter
2 value comprises a global minimum for the LM algorithm.

1 11. (currently amended) A method for determining ~~the a properties~~
2 property of a fluid downhole comprising:
3 ~~deploying a tool in a well bore formed in an adjacent formation;~~
4 interacting with a downhole fluid with a resonator ~~associated with the tool;~~
5 actuating the resonator;
6 receiving a response from the resonator to the actuation of the resonator
7 ~~associated with the fluid;~~ and
8 estimating a value of a the property of the fluid downhole fluid based on
9 the resonator response.

1 12. (currently amended) The method of claim 11, further comprising:
2 estimating a the fluid property ~~value with~~ using a chemometric equation.

1 13. (currently amended) The method of claim 11, further comprising:
2 applying the resonator response to a chemometric equation to determine a
3 the fluid property ~~value~~.

1 14. (original) The method of claim 11, further comprising:
2 deriving a chemometric equation from measured resonator response
3 correlated with known fluid property values.

- 1 15. (currently amended) The method of claim 11, wherein the ~~parameter~~
2 ~~value~~ property is viscosity.
- 1 16. (currently amended) The method of claim 11, wherein the ~~parameter~~
2 ~~value~~ property is density.
- 1 17. (currently amended) The method of claim 11, wherein the ~~parameter~~
2 ~~value~~ property is dielectric constant.
- 1 18. (currently amended) The method of claim 11, wherein the ~~parameter~~
2 ~~value~~ property is resistivity.
- 1 19. (currently amended) The method of claim ~~11~~ 12, further comprising:
2 applying the chemometric estimated parameter value to a Levenberg-
3 Marquardt (LM) algorithm to determine a fluid parameter value for the
4 fluid.
- 1 20. (currently amended) The method of claim 19, wherein the ~~LM algorithm~~
2 ~~calculated~~ fluid parameter value comprises a global minimum for the LM
3 algorithm.
- 1
21-30 (cancelled)

1 31. (original) A system for determining the properties of a fluid
2 comprising:
3 a surface controller for lowering a down hole tool deployed in a well bore
4 formed in an adjacent formation, the tool interacting with a down hole
5 fluid;
6 a resonator associated with the down whole fluid;
7 a controller for actuating the resonator;
8 a monitor for receiving a response from the resonator to the actuation of
9 the resonator such that the response is associated with the fluid; and
10 a processor for estimating a value of a property for the down whole fluid.

1 32. (new) The system of claim 1, further comprising:
2 wherein the processor uses a chemometric equation for estimating a fluid
3 the property value.

1 33. (new) The system of claim 12, further comprising: wherein the
2 processor applies a function applying the resonator response to a the
3 chemometric equation to determine a the fluid property value.

1 34. (new) The system of claim 1, further comprising:
2 wherein the processor uses a function for deriving a chemometric equation
3 from measured resonator response correlated with known fluid property
4 values.

- 1 35. (new) The system of claim 1, wherein the parameter
2 value property is viscosity.
- 1 36. (new) The system of claim 1, wherein the parameter
2 value property is density.
- 1 37. (new) The system of claim 1, wherein the parameter value property is
2 dielectric constant.
- 1 38. (new) The system apparatus of claim 1, wherein the parameter
2 value property is resistivity.
- 1 39. (new) The system of claim 12, further comprising:
2 wherein the processor applying applies the chemometric estimated
3 parameter value property to a Levenberg-Marquardt (LM) algorithm to
4 determine a fluid parameter value for the fluid.
- 1 40. (new) The system of claim 10, wherein the fluid parameter value
2 comprises a global minimum for the LM algorithm.